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Hawaii: Reading an Energy System

How It Works or Fails · Hawaii · Grades 11–12 / First-Year College

Name _____ Date _____ Class _____

How to use this sheet. A ride-alongside worksheet: keep the interactive Hawaii map open beside you. This guide is about reading a region's whole energy system — its lenses, emissions app, vulnerability cards, and scenarios — not tracing one fuel. The thesis underneath every part: a region's energy mix is a set of bets — each source earns its place with a real strength, and in Hawaii every bet is shaped by isolation: each island is its own grid, and nearly every drop of fuel arrives by sea.

The map	Open the Hawaii Fuel Flow Map full-screen. Hawaii is not one grid — each island runs its OWN isolated system, and almost all fuel is shipped in across the ocean.
Lens row	Sweep the lenses — oil, solar, wind, geothermal, hydro — each shown per island; the petroleum detail (bunker fuel oil, diesel, jet) sits underneath. Hover a node for its mix.
Island filter	Switch between Oahu, Maui County, Kauai, and Hawaii Island (the Big Island) — each is a separate grid.
Emissions	The button opens the emissions app — EPA/EIA/state data on who emits what. Note oil-fired power and Fires.
Vulnerability	Press VULNERABILITY for the supply-fragility rings, then open a card. It carries the evidence behind the risk — what the asset depends on and what could take it down — with a four-axis breakdown. Read it as a judgment that can move, not a fixed grade.
Scenarios	The story-row buttons run a real Hawaii event — tsunami, hurricane, eruption, wildfire, shipping halt — on today's infrastructure and move the supply×demand (CURVES) window.

Part 1 · The mix — what runs the islands

Each island is its own grid, and nearly all of it burns imported oil. Sweep the lens row — oil, solar, wind, geothermal, hydro — then use the island filter. The thesis starts here: a region's energy mix is a set of bets — and in Hawaii the bet is shaped by isolation.

Pick ONE island to characterize (different groups take different islands):

- ■ Oahu (Honolulu / Kapolei)
- ■ Maui County (Maui, Molokai, Lanai)
- ■ Kauai (KIUC)
- ■ Hawaii Island — the Big Island

1.1 For your island, sweep the lenses (oil, then each renewable) and name what runs it — and where its clean power comes from. Give one number or fact from the map. How is it powered differently from the other islands?

1.2 Hawaii is the **most oil-dependent state**, and it imports **100% of its finished petroleum products** — with the state's crude entering through a single offshore mooring buoy. What do those facts, plus mid-ocean isolation, tell you about how energy choices get made here?

1.3 Sweep the renewable lenses (solar, wind, geothermal, hydro). Every source earns its place with a real strength — pick TWO and name what each is good *at* for Hawaii, and note which are **firm** (run day and night) versus **intermittent**.

Part 2 · The tradeoff — what it costs and what it buys

Open the emissions button. Hawaii burns oil for electricity — rare — so weigh that cost against what oil actually buys an isolated island.

2.1 Open the electric-power breakout. Where do most of Hawaii's power emissions come from — if you have access to one of the mainland maps for comparison, how does this differ from a mainland power grid?

2.2 Switch to a fine-particulate / air-toxics view. What non-power force can dominate Hawaii's air picture?

2.3 You saw in Part 1 that oil is the firm backbone while solar and wind are intermittent. Now weigh it: given the emissions and import dependence you just read, is oil's firmness worth the price for an island grid — and what would have to change to lean less on it?

Part 3 · The weak point — a vulnerability judgment that can move

Press VULNERABILITY and open a card. Hawaii's cards now come in two families — the fuel/supply chain and the power/generation fleet — each carrying the evidence behind its risk. A score is not a fixed grade; it is a judgment about how the asset can fail, and it moves as conditions or research change.

Pick ONE asset to read (different groups take different assets — mix fuel and power):

- Par East Refinery (Oahu) — the last refinery, and it makes the power fuel
- Barbers Point SPM (Oahu) — one crude buoy, but a swappable one
- Oahu residual fleet — the grid runs on residual oil
- Maui (MECO) — 35% of firm generation retiring under permit by 2028
- Red Hill / JBPHH — 104M gallons of buffer, deliberately removed
- Kauai (KIUC) — the island that built its way out (the low one)

3.1 Open your asset's card and read its evidence — what it depends on, what has already happened to it, what its failure would take down. In your own words, what is this asset's real vulnerability: where and how does it fail? Cite the card.

3.2 A rating is a snapshot of today's conditions. Name one specific change that would make your asset MORE vulnerable and one that would make it LESS — and say why. Think about what the risk actually rides on: a second refinery or import route, more rooftop-and-utility solar with storage, a retirement replaced on time (or not), a strategic fuel reserve, a harbor's weather exposure.

3.3 (Optional — needs outside research.) Now judge the map's rating for your asset: is it well-supported, understated, or overstated? Take a position and back it with evidence beyond the card — a utility's IRP or a PUC docket, a refinery's filings, a retirement or replacement schedule. A vulnerability rating is only as current as the evidence behind it. (Two of Hawaii's cards even flag themselves as 'thin' — no outage on record — so they openly invite the check.)

Part 4 · The shock — run a scenario

Each scenario runs a real Hawaii event on today's infrastructure and moves the supply×demand (CURVES) window. The theme: islands can't import power from each other, and the fuel itself arrives only by sea. (Before running Kilauea '18, open the Geothermal lens — the eruption buries exactly the PGV plant it shows.)

Pick ONE scenario to run (different groups take different shocks):

- ■ Hilo '60 — the 1960 tsunami hits Hilo
- ■ Iniki '92 — hurricane flattens Kauai's grid
- ■ Kilauea '18 — eruption buries Puna geothermal (PGV)
- ■ Maui '23 — the Lahaina wildfire
- ■ Kahuku '12 — battery fire; Oahu's first wind farm dark for over a year
- ■ Refinery Down — Kapolei outage cuts local product

4.1 Run your scenario. What does it hit FIRST, and — because the island can't import power and fuel comes by ship — what has no backup? Name the cascade.

4.2 Watch the supply×demand CURVES window. Which curve moves, and what happens to price/quantity? What is the one-line signature of your shock?

4.3 Tie it back: what do these Hawaii shocks share that a mainland blackout scenario would not?

Part 5 · Judgment — defend a claim

Use evidence from at least two earlier parts. There is no single right answer — the argument is graded, not the side.

5.1 Hawaii is the most oil-dependent, most isolated grid in the country — every drop imported by sea to island grids that can't share power, with the state's crude entering through a single buoy. **Is that dependence a manageable reality or a national vulnerability? Can renewables solve this**

problem? Take a position and defend it with specific evidence from at least two parts (an island mix, an emissions/benefit reading, a vulnerability judgment, or a scenario signature).